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(54) Case for housing machine components of a printer.

(57) A case (1,3) having a space (10) therein for housing machine components (2a, 2b, 2c, 2d) of a printer, the case (1,3) being provided with a sheet guide (5) which is rotatably mounted so that it may be disposed in a first position (5b) in which it is adapted to guide an individual cut sheet (7a) of paper towards the machine components (2a,2b,2c,2d) and a second position in which it is adapted to guide fanfold paper or continuous stationery (7b) towards the machine components (2a,2b,2c,2d), and paper ejection guide means (3d,3f) for guiding the removal of the paper (7a,7b) from the machine components (2a,2b,2c,2d) characterised in that the case (1,3) comprises an upper case (3) which is provided with the sheet guide (5) and paper ejection guide means (3d,3f); a lower case (1) which is provided with the space (1c) for housing the machine components (2a,2b,2c,2d); and coupling means (30) for coupling the upper case (3) to the lower case (1) so that the upper case (3) may be rotated with respect to the lower case (1) between open and closed positions, closing movement of the upper case (3) being accompanied by substantially greater friction than opening movement thereof.

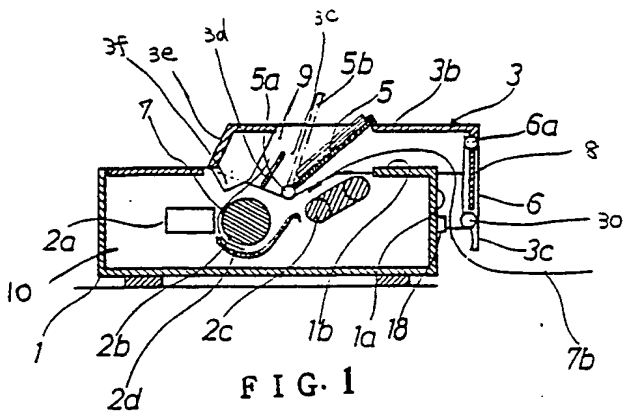

FIG. 1

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CASE FOR HOUSING MACHINE COMPONENTS OF A PRINTER

The present invention relates to a case for housing machine components of a printer.

A printer is known whose case has a space therein in which are mounted machine components of the printer such as a printing head and a platen. The case is provided with paper ejection guide members for guiding paper which is ejected from the printing head, a push-tractor for feeding fanfold paper from the upper side of the printer, and a separator whose position can be adjusted according to whether a cut sheet of paper or fanfold paper is being printed. In such a printer, however, when fanfold paper is being used, the separator, which is mounted above the push-tractor, must be rotated to a suitable position or must be removed from the printer, and such removal is inefficient.

Further, when paper is jammed within the printer or when parts of the printer such as the printing head or the ink ribbon are checked for maintainance purposes, the paper ejection guide members or the separator, which are provided at the upper end of the printer body, must be removed every time.

According to the present invention, there is therefore provided a case having a space therein for housing machine components of a printer, the case being provided with a sheet guide which is rotatably mounted so that it may be disposed in a first position in which it is adapted to guide an individual cut sheet of paper towards the machine components and a second position in which it is adapted to guide fanfold paper or continuous stationery towards the machine components, and paper ejection guide means for guiding the removal of the paper from the machine components characterised in that the case comprises an upper case which is provided with the sheet guide and paper ejection guide means; a lower case which is provided with the space for housing the machine components; and coupling means for coupling the upper case to the lower case so that the upper case may be rotated with respect to the lower case between open and closed positions, closing movement of the upper case being accompanied by substantially greater friction than opening movement thereof.

In the case of the present invention, therefore, any difficulties in paper feeding can be easily handled, and the machine components of the printer can be easily checked for maintenance purposes. Thus when there are difficulties such as jamming of the paper, or when the machine components need to be checked for maintenance purposes, the upper portions of the latter will be exposed merely by opening the upper case,thereby simplifying the operation. In addition, the arrangement is preferably such that if the sheet guide is rotated towards the first position while the upper case is shut,a character can be printed on a cut sheet.

Since the upper case has the sheet guide and the paper ejection guide means, the weight thereof is heavy. However, the construction is such that the upper case can be opened by means of relatively weak force. Further, the present invention prevents the upper case from being unexpectedly shut by impact due to its own weight. Therefore, the upper case can be smoothly opened or shut.

Preferably the coupling means is carried by the upper case and has a lock member which is releasably engageable with an engagement portion of the lower case so as to lock the coupling means to the lower case. This enables the upper case to be easily removed from the lower case when necessary.

The lock member preferably has a resilient portion for resiliently urging the lock member into its locked position.

The coupling means preferably comprises a coil spring which is wound up during the said closing movement and is unwound during the said opening movement.

The invention also comprises a printer having a case within which are mounted machine components of the printer, the case being provided with a sheet guide which is rotatably mounted so that it may be disposed in a first position in which it is adapted to guide an individual cut sheet of paper towards the machine components and a second position in which it is adapted to guide fanfold paper or continuous stationery towards the machine components and paper ejection guide means for guiding the removal of the paper from the machine components characterised in that the case comprises an upper case which is provided with the sheet guide and paper ejection guide means; a lower case which is provided with the machine components;and coupling means for coupling the upper case to the lower case so that the upper case may be rotated with respect to the lower case between open and closed positions, closing movement of the upper case being accompanied by substantially greater friction than opening movement thereof.

The invention is illustrated, merely by way of example in the accompanying drawings, in which:-

Figure 1 is a sectional view of a printer provided with a case according to the present invention;

Figure 2 is a perspective view of the structure shown in Figure 1;

Figure 3 is a sectional view similar to Figure 1 but showing an upper case thereof open;

Figure 4 is a perspective view of the structure shown in Figure 3;

Figure 5 is a sectional view of a part of a coupling means forming part of the present invention;

Figure 6 is an exploded perspective view of components of the said coupling means;

Figures 7 (a) and (b) are a side view and a plan view respectively of the said coupling means;

Figures 8(a) and (b) are a side sectional view and a sectional plan view respectively showing the said coupling means engaged with a lower case; and

Figure 9 is a sectional view of a known printer.

In Figure 9 there is shown a known printer having a case 90 provided with paper ejection guide members 93f and 93d for guiding paper 97 which is ejected from a printing head 92a. The printer has a push-tractor or the like 92c for feeding fanfold paper 97b from the upper side and a separator 95 which has a bearing (or fixing portion) 95b near a space 96 through which a cut sheet (not shown) can pass. The separator 95 can be adjusted to positions which are respectively suitable for printing a cut sheet or printing fanfold paper.

In the case of the known printer, however, when fanfold paper is being used, the separator 95 which covers the push-tractor or the like 92c must be rotated in the direction of an arrow 98 or otherwise the separator 95 must be removed from the printer, which is inefficient.

Further, when paper is jammed within the printer or when parts such as the printing head 92a or the ink ribbon (not shown) are checked for maintainance purposes, the paper ejection guide members 93d, 93f and the separator 95 which are provided on the upper side of the printer must be removed every time.

In Figures 1-8 there is therefore shown a case according to the present invention which comprises an upper case 3 which constitutes a paper guide device for guiding paper 7 in and out of a printer and a lower case 1 having a space 10 therein for carrying machine components of a printer such as a printing head 2a, a platen member 2b, a push-tractor member 2c and a paper guiding member 2d as the main components. The upper case 3, which has the said paper guide device for guiding the paper 7 in and out of the printer, is coupled by a coupling means 30 to the lower case 1 so that it can be rotated with respect to the lower case 1 and can be easily removed therefrom. The lower case 1 has side walls 1 and a top wall 1b. The upper case 3 has an upper wall 3b.

A sheet guide 5 for guiding a cut sheet 7a - (Figure 2) to the machine components is connected at a hinge 5a to the upper case 3. When a cut sheet 7a is fed to the printing head 2a, the sheet guide 5 is set at the proper angle as indicated by dotted lines at 5b. The sheet guide 5 is thus rotatably mounted between a first, or dotted line, position 5b in which it is adapted to guide an individual cut sheet 7a of paper towards the platen 2b and printing head 2a, and a second, or full line, position in which it is adapted to guide fanfold paper or continuous stationery 7b towards the platen 2b and printing head 2a.

Width control plates 5c and 5d (Figure 2) for maintaining a cut sheet 7a in a desired position are mounted on the sheet guide 5 so that they can be moved by sliding in the horizontal direction.

A plate-shaped paper ejection guide plate 3d, as best seen in Figure 4, extends across the gap between side plates 3c of the upper case 3 and is fixed thereto.

A plurality of fan-shaped paper ejection guides 3f are provided for guiding the paper out. The paper ejection guides 3f guide printed paper 7 towards an exit 9 for the ejection of the paper. The paper ejection guides 3f are incorporated on the inside of a sheet guide cover 3e of the upper case 3. Therefore, the printed paper 7 can pass between the paper ejection guides 3f and the paper ejection guide plate 3d and can thereafter pass towards the exit 9.

There is a large opening 8 (see Figure 3) in the rear side of the upper case 3. A rear cover 6 is mounted on a hinge 6a which is provided near the upper end of the opening 8 so that the rear cover 6 can be rotated about the hinge 6a.

A stopper 3c is provided on the lower side of the coupling means 30 of the upper case 3. When the upper case 3 is opened wide (see Figure 3), the stopper 3c abuts against a projection 18 provided at the rear side of the lower case 1.

Figure 3 is a sectional view showing the positions of the parts when the upper case 3 which constitutes a paper guide device for guiding the paper in and out is rotated backwards around the coupling means 30. Figure 4 is a perspective view of the parts in this condition. In this condition, fanfold paper 7b can be set in the printer. Namely, the upper case 3 is opened wide until the stopper 3c mounted on the upper case 3 touches the projection 18 provided on the lower case 1. In this condition, the rear cover 6 rotates under its own weight around the hinge 6a and hangs downwards (see Figure 3), and therefore the opening 8 on the rear side of the upper case 3 is opened wide. Therefore, a user can set fanfold paper 7b very easily onto the push-tractor member 2c by passing it through the opening 8. Since the upper side of

the platen 2b is wide open, the fanfold paper 7b can be easily inserted between the platen 2b and the paper guide member 2d, thereby easily setting the paper in position, the paper setting being completed by shutting the upper case 3.

When printing is started, fanfold paper 7b comes through the space between the paper guide member 2d and the platen 2b, is guided through the space between the paper ejection guides 3f and the paper ejection guide plate 3d and is ejected through the exit 9 (see Figure 1).

When a cut sheet 7a is used, the sheet guide 5 is set at the position shown by the dotted lines 5b of Figure 1, the upper case 3 being closed. The cut sheet 7a is set in between the width control plates 5c, 5d (see Figure 2). As in the case of the fanfold paper 7b, the cut sheet 7a is printed by the printing head 2a and is thereafter ejected from the exit 9.

When there is a problem such as a paper jam or one or more of the machine components, such as the printing head 2a, the platen 2b, the push-tractor member 2c and paper guide member 2d, require maintenance, all the machine components can be exposed by opening the upper case 3 wide. Therefore, a user can easily deal with a paper jam or can check the machine components for maintenance purposes.

The present invention may be used for printers whose cut sheet feeder may either comprise a push-tractor or a pull-tractor or both push and pull tractors.

The coupling means 30 for coupling the upper case 3 to the lower case 1 is described below in greater detail.

Reference will first be made to the features of the coupling means 30 which cause substantial friction only when the upper case 3 is moved to shut it.

As shown in Figure 5, a metal coil spring 35 is wound around the circumferential portions of a fixed bearing 31 and of a bearing 32 which is rotatably mounted on a main shaft 33. When the upper case 3 is moved in the closing direction, substantial friction will be generated by the winding up of the coil spring 35, but when the upper case 3 is moved in the opening direction, since the bearing 31 is fixed and the bearing 32 is rotated in the unwinding direction, the bearing 32 is rotated almost without friction.

By mounting the bearing 32 on the lower case 1 or on the upper case 3, the upper case 3 can be smoothly opened by the use of a weak force. By applying appropriate force, moreover, the upper case 3 can be shut.

Figure 6 is an exploded perspective view showing a movable arm 39 and a fixed arm 40. As is clear from the drawing, the bearing 31 and the bearing 32 have substantially D-shaped cut-out portions or projections 31a and 32a at the opposite ends thereof, respectively, in order to fit the fixed arm 40, which is fixed to the lower case 1, and the movable arm 39 which is fixed to the upper case 3, respectively. The movable arm 39 and the fixed arm 40 are coupled to these D-shaped cut-out portions, a groove 33a for an E-shaped stopper ring 34 and a spacer 36 being provided at each of the ends of the main shaft 33 so as to prevent the main shaft 33 from coming out.

Figures 7(a) and 7(b) are detailed views showing the construction of the coupling means 30. As is clear from Figure 7(a), the movable arm 39 has a substantially rectangular hole 39a in it and the cut-out portion 32a of the bearing 32 is inserted in the substantially rectangular hole 39a The substantially rectangular hole 39a is of an elongated shape which extends substantially vertically of the bearing 32. The end of the movable arm 39 which is remote from the bearing 32 is bent so as to cover a lock lever 38, the movable arm 39 having holes 39d and 39e, as shown in Figure 7(b), supporting a lock lever stopping shaft 37 so as to permit rotation of the latter.

The lock lever stopping shaft 37 is supported by the lock lever 38 the latter being made of synthetic resin. The lock lever 38 has a handle 38a, a resilient portion 38c for supplying restoring force when the lock lever 38 is rotated counter-clockwise as seen in Figure 7(a), a projection 38d which is formed at the end of the resilient portion 38c and which is engageable in a rectangular hole 39b of the movable arm 39, and a nail-shaped stopper 38b described below.

The lock lever stopping shaft 37 is provided with E-shaped stopping rings 37a, 37b mounted on the outside of the holes 39d, 39e of the movable arm 39, thereby controlling the position of the lock lever stopping shaft 37 in the right and left directions of Figure 7(b). The movable arm 39 can slide in the directions indicated by a double-headed arrow P. When the movable arm 39 is rotated around the shaft 33 in the angular direction indicated by an arrow Q with respect to the fixed arm 40, friction is generated.

Figure 8(a) is a sectional view of the coupling means 30 described above, and Figure 8(b) is a sectional view of the structure shown in Figure 8-(a), taken along the line S-S of the latter.

As will be seen in Figure 8(a), a bearing portion 44 of the lower case 1 has a main shaft guiding means 44e for supporting both the ends of the main shaft 33, lock lever guiding grooves 44b in which both the ends of the lock lever stopping shaft 37 can slide in an almost vertical direction but so that their movement in the horizontal direction is limited, and a lock lever stopping portion 44d which is engageable with the stopping portion 38b when

the lock lever 38 is depressed.

The upper case 3 may be mounted on the lower case 1 as described below.

First, the main shaft 33 of the coupling means 30 mounted on the upper case 3 is put into the main shaft guide grooves 44e from above and is set in a main bearing 44a of the bearing portion 44. In order to effect locking, the lock lever 38 is rotated in the angular direction indicated by the arrow R in which friction is not generated until a contact surface 39c on the movable arm 39 comes into contact with a contact surface 44c of the lower case 1. When this occurs, the resilient portion 38c of the lock lever 38 is bent to urge the stopping portion 38b to the left side as seen in Figure 8(a).

Subsequently, the lock lever 38 is depressed along the contact surface 44c of the lower case 1, and the engaging portion 38b of the lock lever 38 is engaged with the engaging portion or shoulder 44d of the lower case 1, as indicated by the dotted line 38g in Figure 8(a). Owing to the restoring force of the resilient portion 38c of the lock lever 38, the lock lever 38 is rocked by the lower case 1. At the same time, both the ends of the lock lever stopping shaft 37 are inserted into the lock lever guide grooves 44b so that the movement thereof is controlled in the horizontal direction. The direction of the long axis of the substantially rectangular hole 39a of the movable arm 39 is parallel to the contact surface 44c of the lower case 1 which is formed by the lower case 1 and the lock lever guiding grooves 44b. When the movable arm 39 is depressed, the stopping shaft 37 is engaged with the lock lever stopping guide grooves 44b. When the movable arm 39 is pulled up, this engagement is released.

When the lock lever 38 is locked to the lower case 1, the upper case 3 can be opened by a weak force because there will be little friction. When the fixing arm 40 is rotated in the direction of the arrow R, that is when the upper case 3 is closed, there is a substantial amount of friction, thereby preventing it from suddenly being opened as a result of a shock.

Further, in this condition, if the upper case 3 is pulled upwardly, the upper case 3 does not come off because the lock lever 38 is engaged with the lower case 1.

When the upper case 3 and the coupling means 30 are removed from the lower case 1, the fixing arm 40 is rotated in the direction of the arrow Q and the lock lever 38 is rotated in the direction of the arrow R and thereafter is pulled up. Then the lock lever stopping portion 38b is removed from the lock lever engaging portion 44d and the lock lever stopping shaft 37 is removed from the lock lever guiding grooves 44b, thereby being free. When the upper case 3 and the coupling means 30 are pulled up, the main shaft 33 is removed from the main guide grooves 44e and the upper case 3 is removed from the lower case 1.

Claims

1. A case (1,3) having a space (10) therein for housing machine components (2a, 2b, 2c, 2d) of a printer, the case (1,3) being provided with a sheet guide (5) which is rotatably mounted so that it may be disposed in a first position (5b) in which it is adapted to guide an individual cut sheet (7a) of paper towards the machine components (2a,2b,2c,2d) and a second position in which it is adapted to guide fanfold paper or continuous stationery (7b) towards the machine components (2a,2b,2c,2d), and paper ejection guide means (3d,3f) for guiding the removal of the paper (7a,7b) from the machine components (2a,2b,2c,2d) characterised in that the case (1,3) comprises an upper case (3) which is provided with the sheet guide (5) and paper ejection guide means (3d,3f); a lower case (1) which is provided with the space (1c) for housing the machine components (2a,2b,2c,2d); and coupling means (30) for coupling the upper case (3) to the lower case (1) so that the upper case (3) may be rotated with respect to the lower case (1) between open and closed positions, closing movement of the upper case (3) being accompanied by substantially greater friction than opening movement thereof.

2. A case as claimed in claim 1 characterised in that the coupling means (30) is carried by the upper case (3) and has a lock member (38) which is releasably engageable with an engagement portion (44d) of the lower case (1) so as to lock the coupling means (30) to the lower case (1).

3. A case as claimed in claim 2 characterised in that the lock member (38) has a resilient portion (38c) for resiliently urging the lock member (38) into its locked position.

4. A case as claimed in any preceding claim characterised in that the coupling means (30) comprises a coil spring (35) which is wound up during the said closing movement and is unwound during the said opening movement.

5. A printer having a case (1,3) within which are mounted machine components (2a,2b,2c,2d) of the printer, the case (1,3) being provided with a sheet guide (5) which is rotatably mounted so that it may be disposed in a first position (5b) in which it is adapted to guide an individual cut sheet (7a) of paper towards the machine components (2a,2b, 2c,2d) and a second position in which it is adapted to guide fanfold paper or continuous stationery (7b) towards the machine components (2a,2b,2c,2d), and paper ejection guide means (3d,3f) for guiding

the removal of the paper (7a,7b) from the machine components (2a,2b,2c,2d) characterised in that the case (1,3) comprises an upper case (3) which is provided with the sheet guide (5) and paper ejection guide means (3d,3f); a lower case (1) which is provided with the machine components (2a,2b,2c,2d); and coupling means (30) for coupling the upper case (3) to the lower case (1) so that the upper case (3) may be rotated with respect to the lower case (1) between open and closed positions, closing movement of the upper case (3) being accompanied by substantially greater friction than opening movement thereof.

6. A case structure of a printer comprising:
an upper case (3) having a sheet guide (5) supported at a first position and a second position so that it can be rotated, said sheet guide (5) guiding a cut sheet (7a) before recording at said first position (5b) and said sheet guide (5) guiding a fanfold paper (7b) after recording at the second position, paper eject guide means (3d, 3f) provided near the ejection portion of machine components (2a,2b,2c,2d) which ejects a recording material (7) and which guides a recording material (7) to an exit (9) which a paper is ejected from, and an opening portion (8) which a fanfold paper (7b) before recording passes through;
a lower case (1) for holding said machine components (2a,2b,2c,2d) and
a coupling means (30) which supports said upper case (3) so that said upper case (3) can be rotated around said lower case (1) and which causes friction when the upper case (3) is rotated in the direction that said upper case (3) is closed.

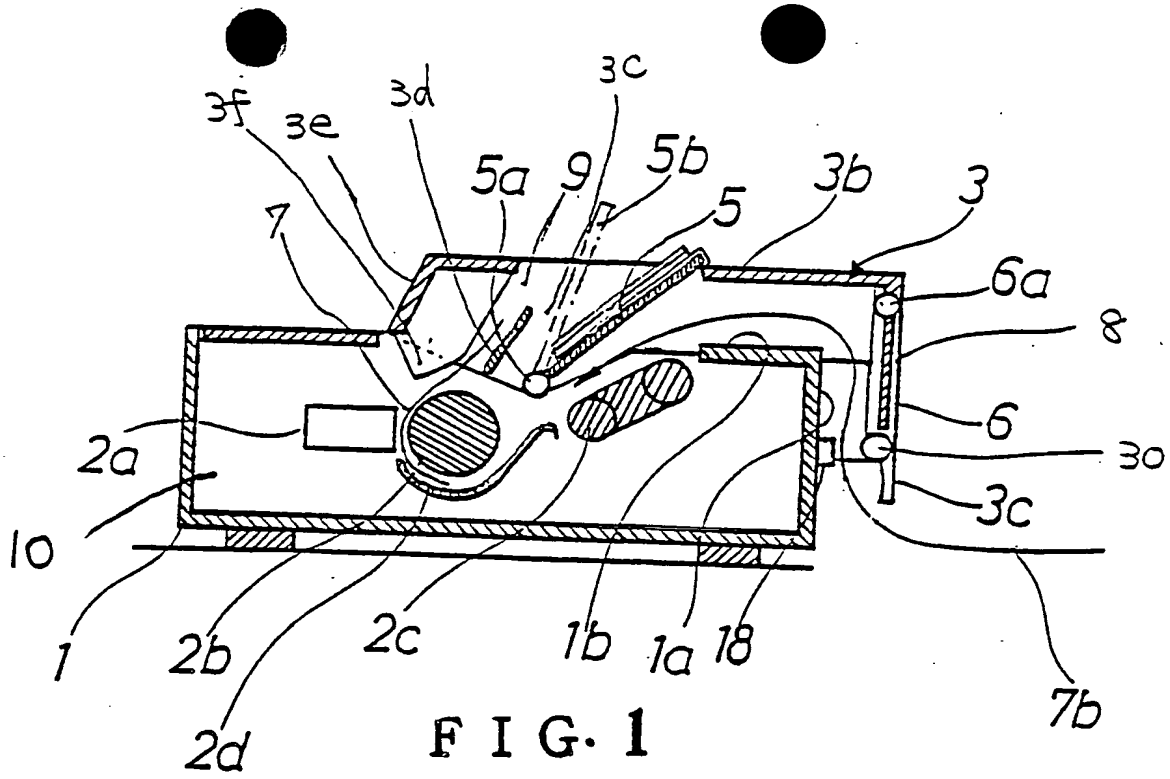

FIG. 1

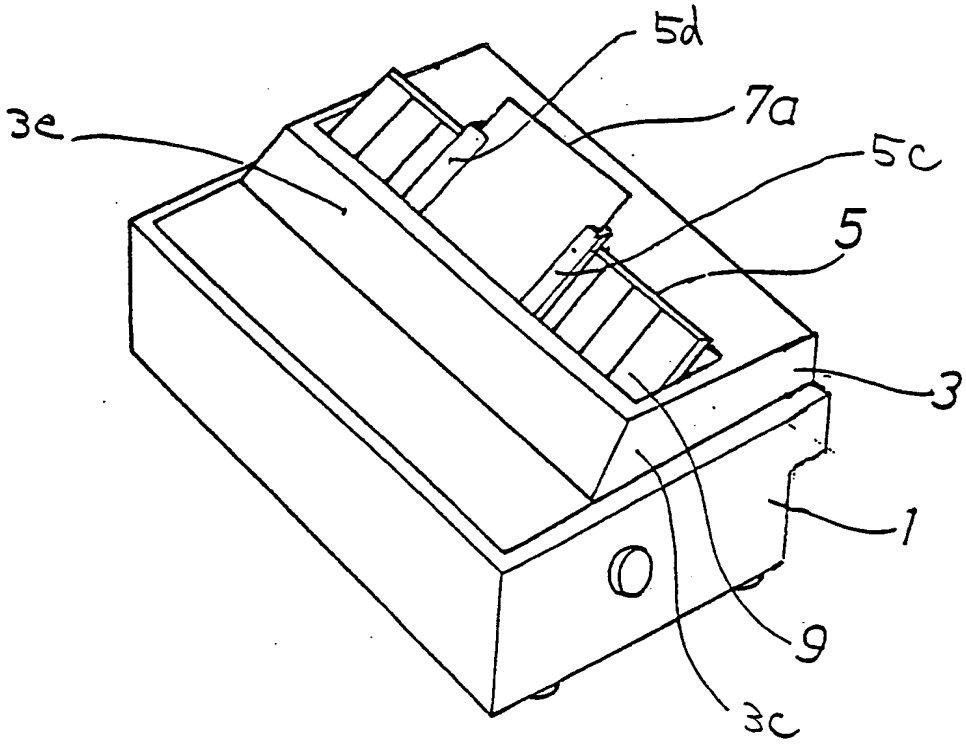

FIG. 2

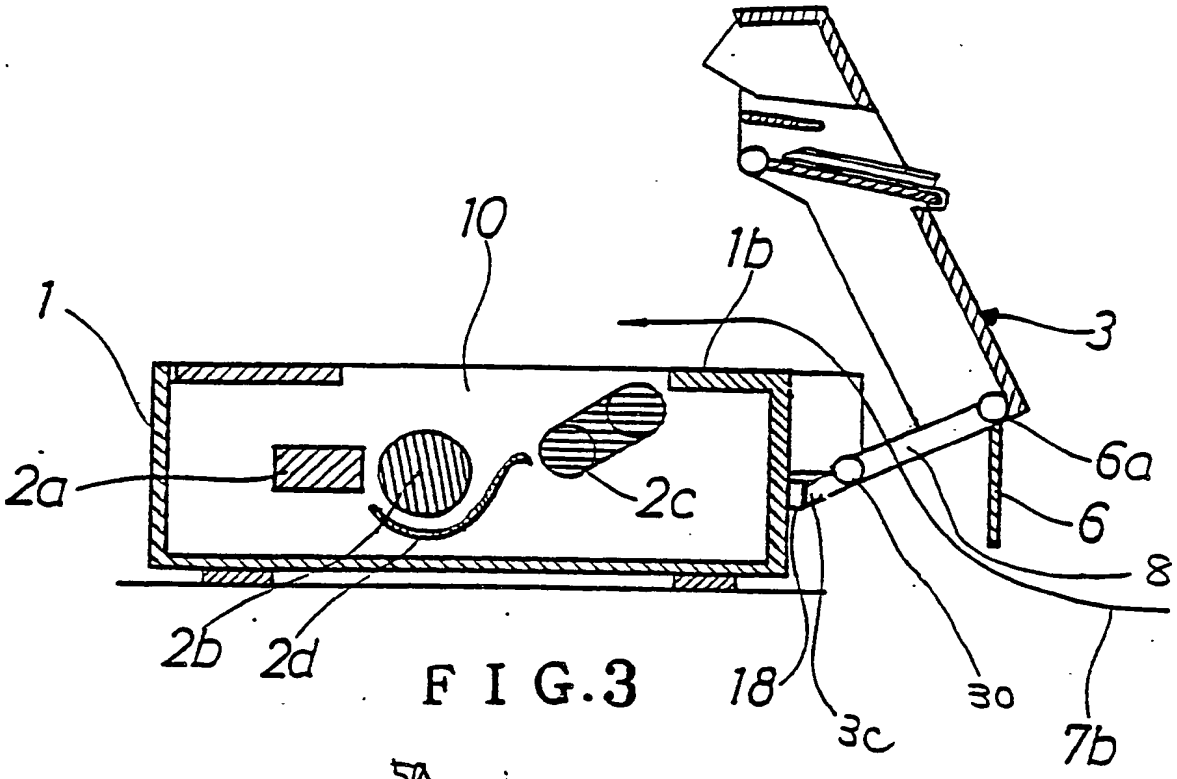

FIG.3

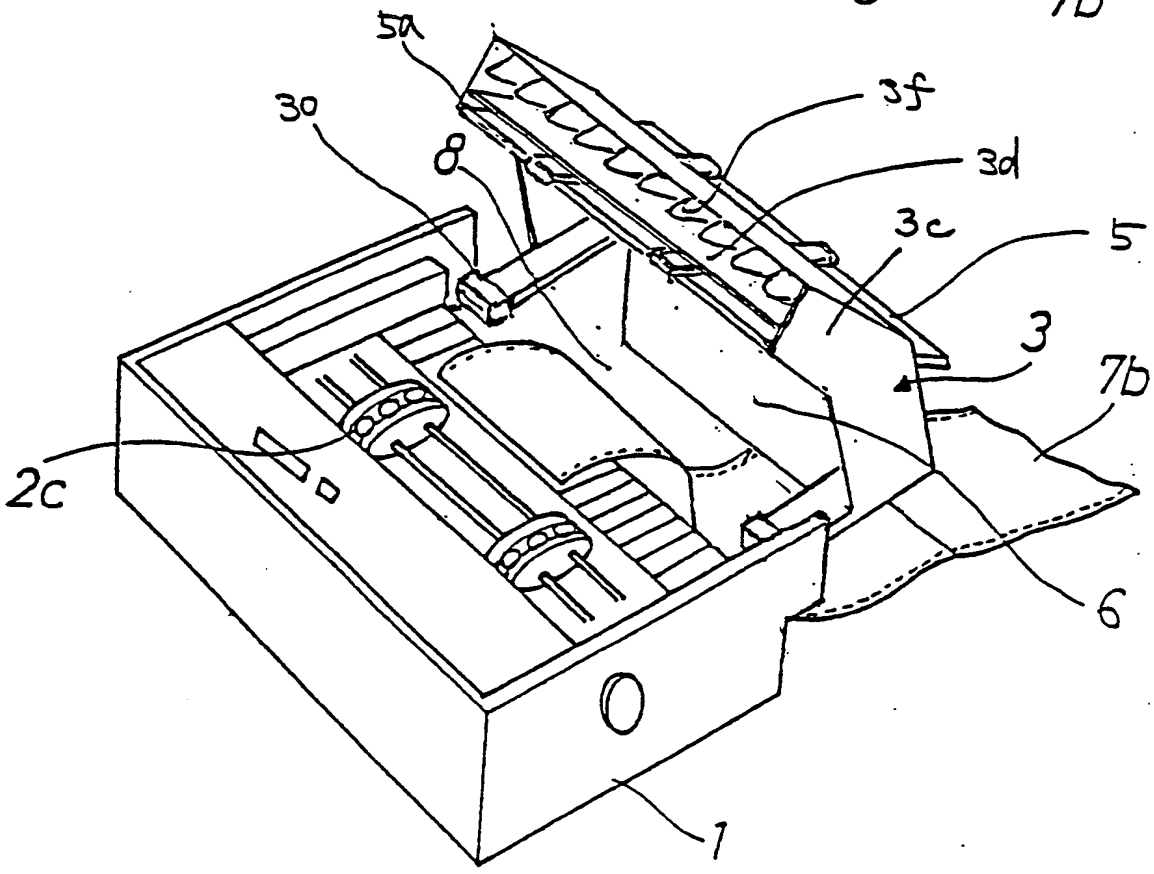

FIG. 4

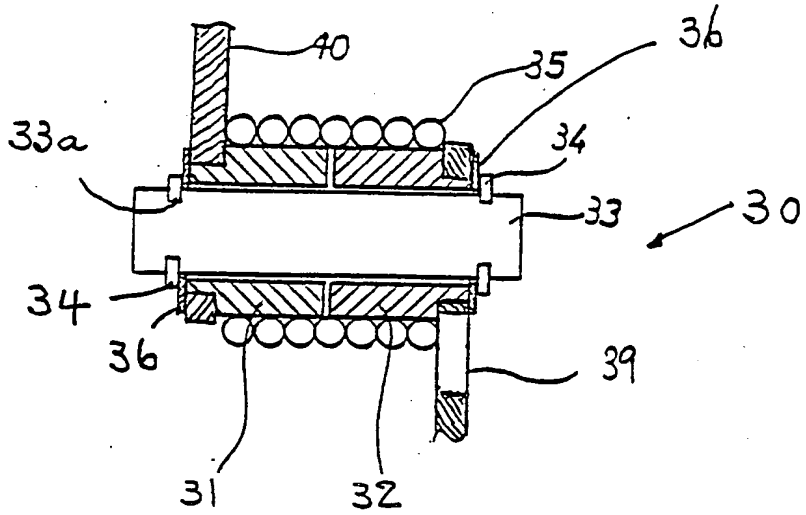

FIG 5

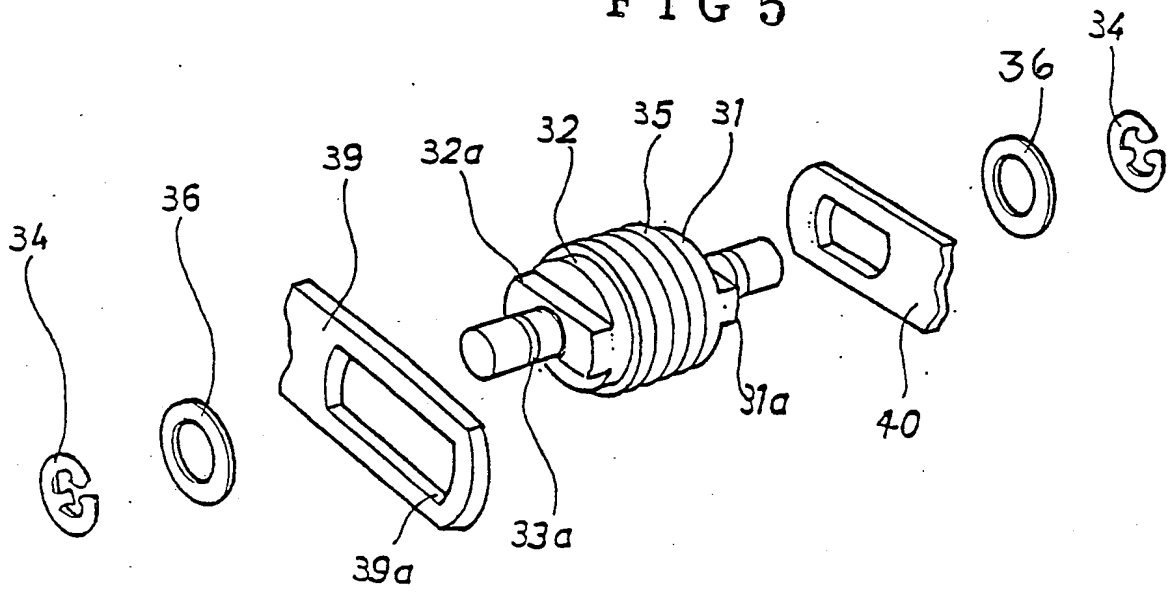

FIG.6

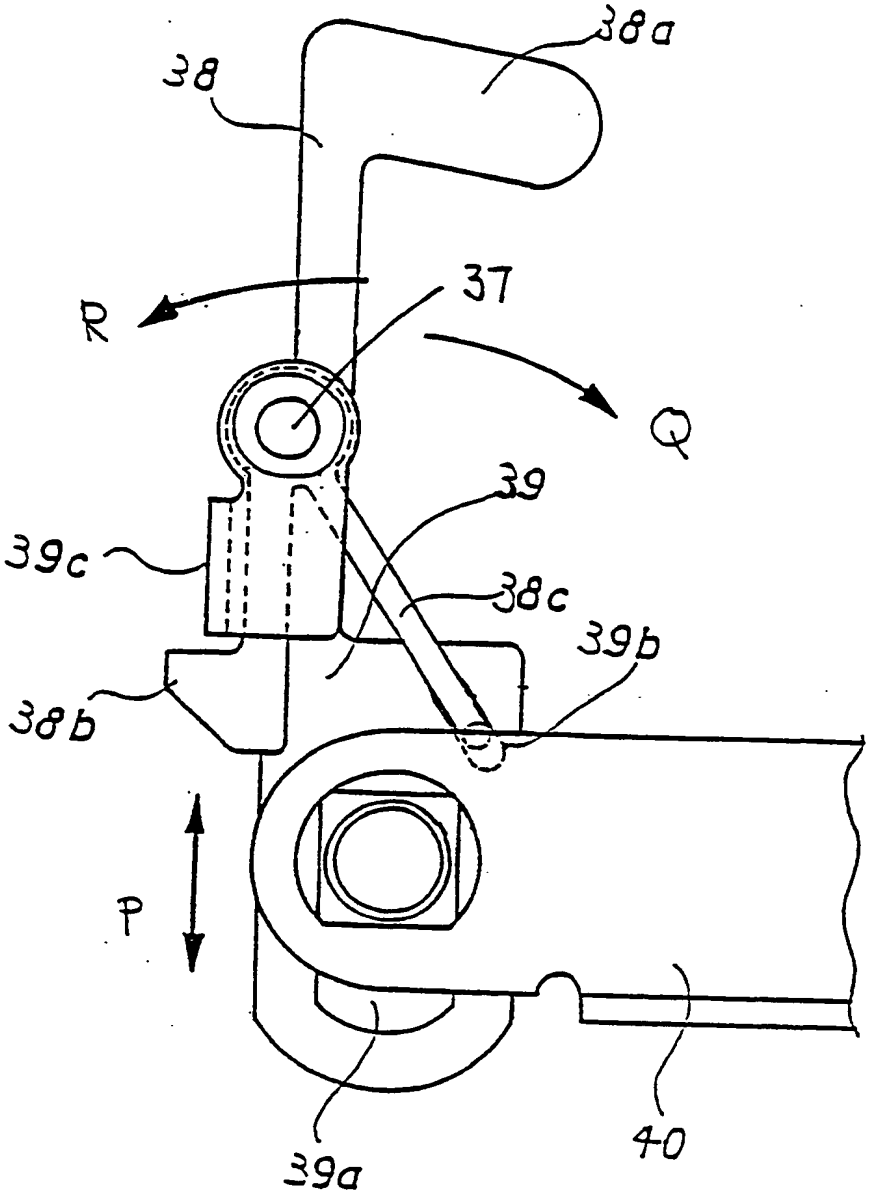

FIG. 7 (a)

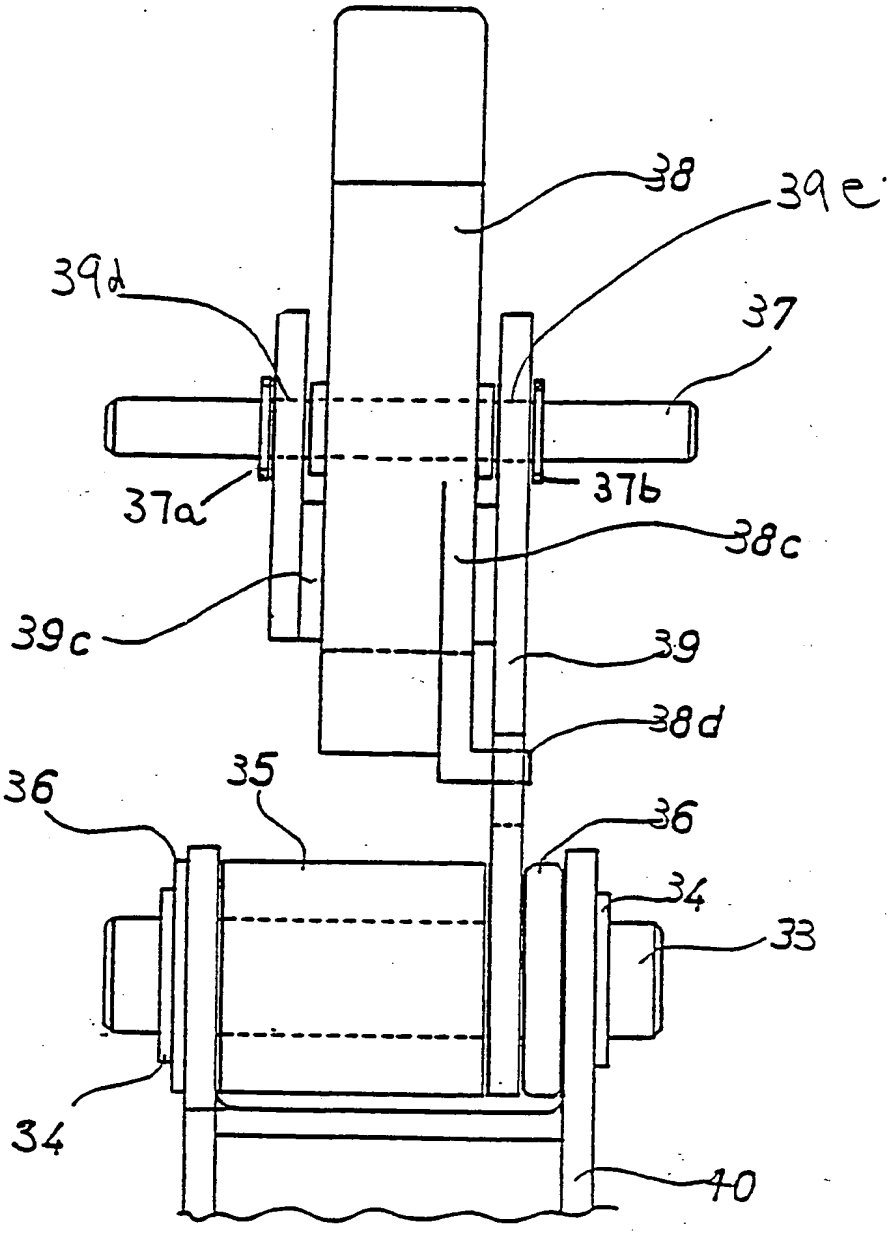

FIG. 7 (b)

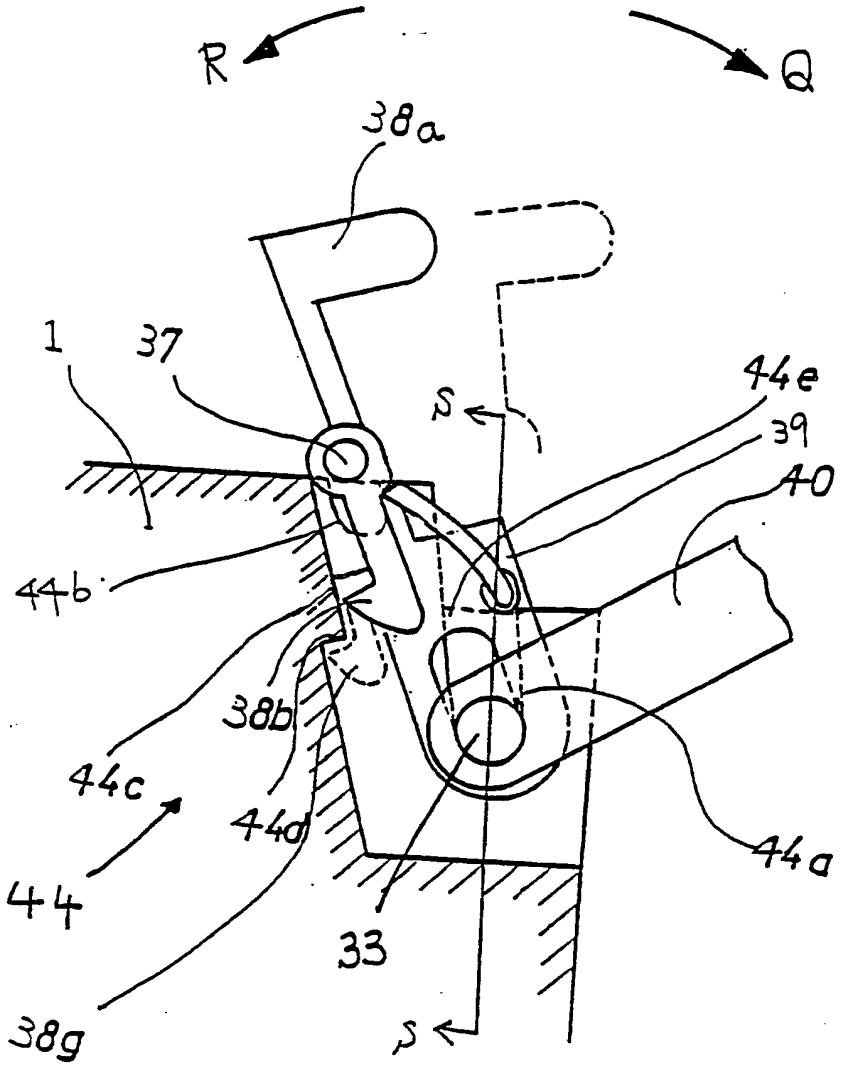

FIG.8(a)

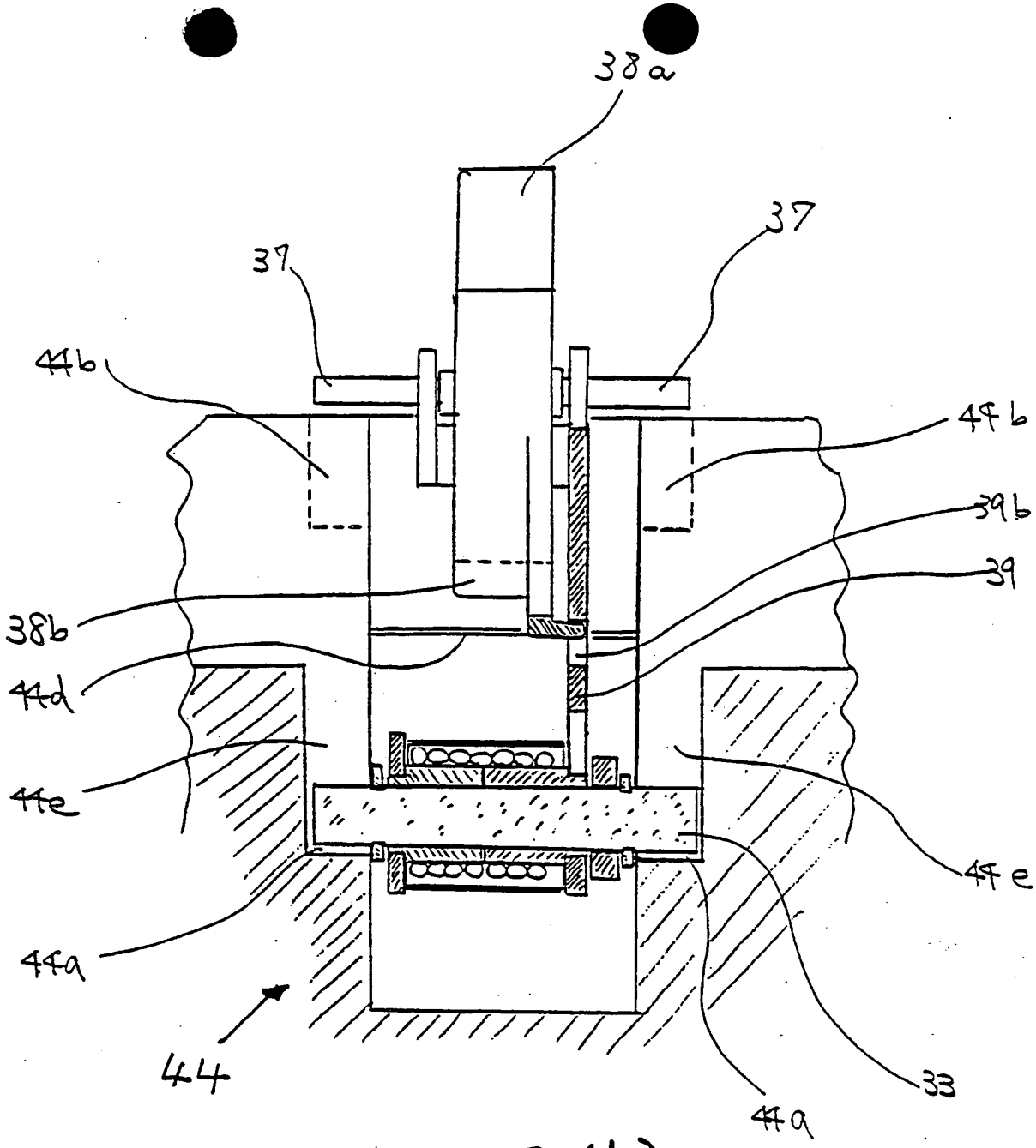

FIG.8(b)

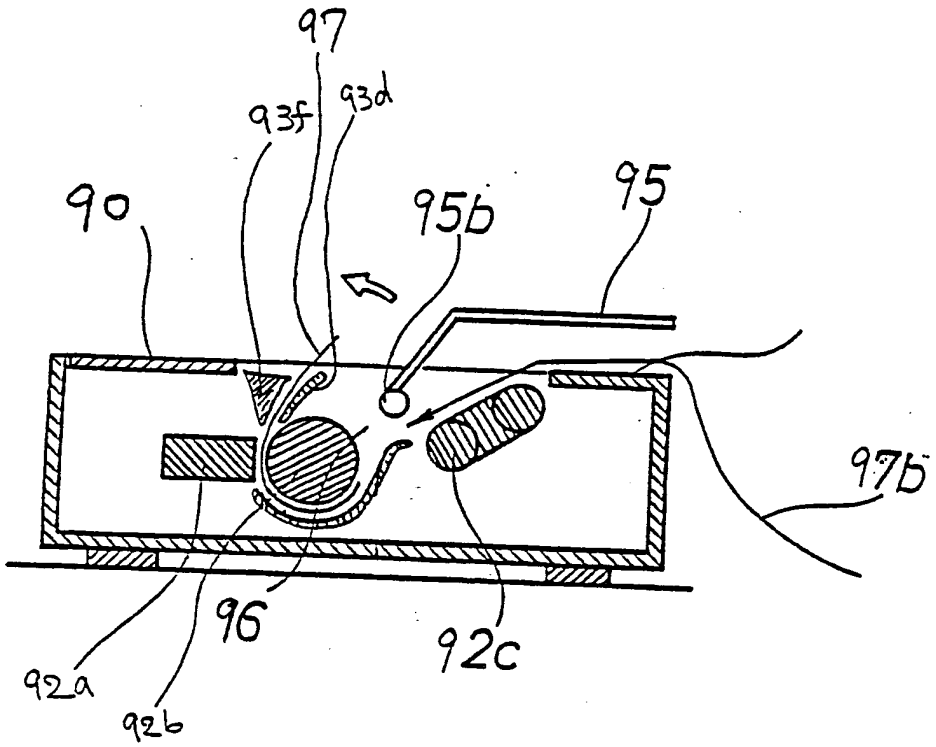

FIG. 9

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(54) Case for housing machine components of a printer.

(57) A case (1,3) having a space (10) therein for housing machine components (2a, 2b, 2c, 2d) of a printer, the case (1,3) being provided with a sheet guide (5) which is rotatably mounted so that it may be disposed in a first position (5b) in which it is adapted to guide an individual cut sheet (7a) of paper towards the machine components (2a,2b,2c,2d) and a second position in which it is adapted to guide fanfold paper or continuous stationery (7b) towards the machine components (2a,2b,2c,2d), and paper ejection guide means (3d,3f) for guiding the removal of the paper (7a,7b) from the machine components (2a,2b,2c,2d) characterised in that the case (1,3) comprises an upper case (3) which is provided with the sheet guide (5) and paper ejection guide means (3d,3f); a lower case (1) which is provided with the space (1c) for housing the machine components (2a,2b,2c,2d); and coupling means (30) for coupling the upper case (3) to the lower case (1) so that the upper case (3) may be rotated with respect to the lower case (1) between open and closed positions, closing movement of the upper case (3) being accompanied by substantially greater friction than opening movement thereof.

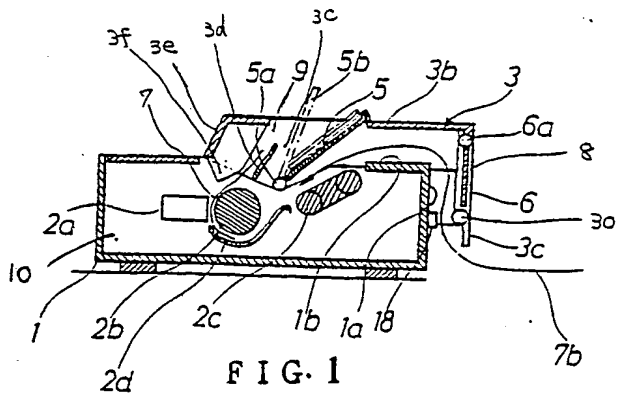

FIG. 1

EP 0 326 277 A3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 89 30 0443

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	EP-A-0 090 401 (SIEMENS AG) * abstract; figures 1,2 *	1,5,6	B 41 J 29/12 B 41 J 11/00
A	US-A-2 418 043 (L.C. MYERS) * figures 1,5 *	1,4,5	
A	DE-C- 740 110 (TRIUMPH-WERKE) * figures 1-3 *	1	
A	DE-C- 401 597 (WANDERER-WERKE) * figures 1-5 *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

B 41 J

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	02-04-1990	ZOPF K

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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